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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,088	11/16/2001	Jack O. Chu	BUR920000077	8055

7590 05/28/2004  
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EXAMINER

SONG, MATTHEW J

ART UNIT PAPER NUMBER

1765

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

09/683,088

CHU ET AL.

Examiner

Art Unit

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/11/2004 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites, "a first pumping system coupled to said reaction chamber" in line 6 and "a second pumping system coupled to said reaction chamber" in line 9. There is no support in the instant specification for "coupled". The instant specification merely teaches that pumping systems are connected to flanges, which are connected to the reaction chamber and that a load lock chamber is coupled to the reaction chamber, note pages 7 and 8

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4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites, “a first pumping system coupled to said reaction chamber” in line 6 and “a second pumping system coupled to said reaction chamber” in line 9. The term “coupled” is unclear because as described in the instant specification, the pumping systems are attached to flanges, which are connected to the reaction chamber and do not appear to be connected directly to the reaction chamber. The Examiner has interpreted the term “coupled” to mean the pumping systems are connected to the reaction chamber, but do not need to be directly in contact with the reaction chamber to expedite prosecution. In other words, intervening piping between the pumping systems, which connects to the reaction chamber would still read on applicant’s “coupled”.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 1-4 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Akbar et al (US 5,259,918).

Akbar et al discloses a quartz reaction chamber **102** and a furnace **104** surrounds the reaction chamber. Akbar et al also discloses a first source **144** for supplying gas to the reaction chamber, a first pumping system comprising a turbomolecular pump **108** and a rotary pump **110** and a second source **148** for supplying a second gas to the reaction chamber. Akbar et al also discloses a second pumping system comprising a turbo molecular pump **118** and a rotary pump **120** and a third pumping system comprising a turbomolecular pump **160**, a roots blower **162**, and a rotary pump **164** (col 5, ln 10-67 and Fig 4), where the third pumping system is coupled to the reaction chamber. Akbar et al also discloses the pumps **118** and **120** can obtain a pressure of approximately 10-50 mTorr, the pumps **108** and **110** can obtain a pressure of approximately  $10^{-7}$  Torr and the pumps **160**, **162** and **164** can obtain a pressure of about 200-300 mTorr (col 6, ln 10-40). Akbar et al also teaches a load lock chamber **106**. Akbar et al discloses the first and second pumping systems are coupled to the reaction chamber when the valve **114** is opened because the first and second vacuum systems are capable of affecting the vacuum pressure of the reaction chamber.

Akbar does not disclose the intended use of the first, second and third pumping systems. However, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152

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USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The apparatus taught by Akbar et al structurally reads on the instantly claimed invention, therefore would be capable of performing the intended use.

Referring to claims 2-3 and 8, Akbar et al does not disclose the intended use of the first and second pumping systems. However, the apparatus taught by Akbar et al is capable of performing the claimed intended use of a LPVCD system because the pumps 118 and 120 can obtain a pressure of approximately 10-50 mTorr and an UHV-CVD system because the pumps 108 and 110 can obtain a pressure of approximately  $10^{-7}$  Torr.

Referring to claim 4, Akbar et al discloses a load lock chamber 106 coupled to a turbo pump, this reads on applicant's turbomolecular pump, and a rotary pump, this reads on applicant's mechanical pump. A rotary pump is a well known in the art to be a mechanical pump, note Meyerson (US 5,298,452) below.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) as applied to claims 1-4 and 8 above, and further in view of Zhou et al (US 5,879,467).

Akbar et al discloses all of the limitations of claim 5, as discussed previously. Akbar et al does not teach the third pumping system comprises a cryopump and a scroll pump arranged in series.

In a vacuum system for chemical vapor deposition (col 4, ln 25-40), Zhou et al teaches a vacuum chamber **14** is connected to a vacuum pump **18** and the vacuum pump is composed of a cryopump **20** and a rough pump **22** (col 5, ln 1-67 and Fig 3). Zhou et al also teaches the rough pump **22** may be a scroll pump or a dry pump (col 7, ln 45-55). Zhou et al also teaches the chamber **14** can be pumped down to  $3 \times 10^{-6}$  Torr (col 5, ln 30-31).

The vacuum pump taught by Zhou obtains equivalent pressures as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akbar et al with Zhou et al's vacuum pump composed of a cryopump and a scroll pump because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06)

10. Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) as applied to claims 1-4 and 8 above, and further in view of Chu et al (US 6,013,134).

Akbar et al discloses all of the limitations of claim 6, as discussed previously. Akbar et al does not teach the first pumping system is coupled to a roots blower and a mechanical pump in series and the second pumping system is coupled to a turbomolecular pump, a roots blower, and a mechanical pump in series.

In an apparatus for chemical vapor deposition, note entire reference, Chu et al teaches an UHV-CVD system includes a turbomolecular pump **24**, a roots blower **25**, and a mechanical pump **26** in series. Chu et al also teaches a UHV-LPCVD system **14** includes a gas inlet **32**, a furnace **33**, a turbomolecular pump **34** followed by a mechanical pump **36**, and a roots blower **35** followed by a mechanical pump **31**. Chu et al also teaches a transfer system **16** includes a turbomolecular pump **40** followed by a mechanical pump **41**, and a cryogenic pump **42** followed by a mechanical pump **43**.

The combination of vacuum pumps taught by Chu et al obtain equivalent pressures, Low pressure and UHV, as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akbar et al vacuum pumps with Chu et al's combination of vacuum pumps composed of a turbomolecular pump, a mechanical

pump and roots blower in series and roots blower and mechanical pump in series because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06)

11. Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) in view of Chu et al (US 6,013,134) as applied to claims 6, 9 and 10 above, and further in view of Zhou et al (US 5,879,467).

The combination of Akbar et al and Chu et al discloses all of the limitations of claim 7, as discussed previously. The combination of Akbar et al and Chu et al does not teach the third pumping system comprises a cryopump and a scroll pump arranged in series.

In a vacuum system for chemical vapor deposition (col 4, ln 25-40), Zhou et al teaches a vacuum chamber 14 is connected to a vacuum pump 18 and the vacuum pump is composed of a cryopump 20 and a rough pump 22 (col 5, ln 1-67 and Fig 3). Zhou et al also teaches the rough pump 22 may be a scroll pump or a dry pump (col 7, ln 45-55). Zhou et al also teaches the chamber 14 can be pumped down to  $3 \times 10^{-6}$  Torr (col 5, ln 30-31).

The vacuum pump taught by Zhou obtains equivalent pressures as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify combination of Akbar et al and Chu et al with Zhou et al's vacuum pump composed of a cryopump and a scroll pump because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06).

***Response to Arguments***

12. Applicant's arguments filed 3/11/2004 have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the first, second and third pumping systems are not isolated from the reaction chamber (pg 5)) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants' argument that the pumping systems of Akbar et al are isolated from the reaction chamber by a valve is noted but is not found persuasive. Applicants' allege the pumping systems are isolated because the process of Akbar et al only uses the first pumping system 108/110 and the second pumping system 118/120 to pump down the load lock chamber. Akbar et al teaches opening the valve 114 (col 6, ln 25-30), which is used to isolate the first and second pumping systems; therefore when the valve is opened the first and second pumping systems are coupled to the reaction system, as claimed by applicants. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The apparatus taught by Akbar et al is capable of creating a vacuum within the

reaction chamber using three different pumping systems. The valve **114** is capable of being opened; therefore the first and second pumping systems of Akbar et al are capable of affecting the vacuum pressure of the reaction chamber and reads on applicants' coupled to the reaction chamber.

### *Conclusion*

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Meyerson (US 5,298,452) teaches a rotary pump and roots blower are high speed mechanical pumps known in the art (col 6, ln 55-60) and a valve is opened to pump down a furnace tube to vacuum (col 7, ln 1-15).

Venkatraman et al (US 6,083,313) teaches a high vacuum is achieved by roughing down a chamber with a mechanical pump followed by pumping with a roots blower pump and other pumping systems with or with traps can also be used (col 4, ln 60-67).

Barnett et al (US 5,783,295) teaches a chamber is evacuable to a high vacuum level of  $1 \times 10^{-6}$  Torr by using a turbomolecular pump backed by a roots blower and mechanical pump combination (col 5, ln 35-55).

Markunas et al (US 5,180,435) teaches an turbomolecular pump and roots blower together with a mechanical pump obtain pressures of  $5 \times 10^{-10}$  Torr when process gases are not flowing and 1-300 mTorr during epitaxial growth (col 6, ln 45-60).

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Collins et al (US 5,210,466) teaches a system may comprise a turbomolecular pump backed by a mechanical pump and an optional roots blower and the turbomolecular pump may be omitted for many high pressure only systems (col 4, ln 45-65).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song  
Examiner  
Art Unit 1765

MJS

NADINE G. NORTON  
SUPERVISORY PATENT EXAMINER

